

**48-4.01(07) Shoulders**

The right shoulder of the mainline will be transitioned to the narrower shoulder of the ramp. As illustrated in Figure 48-4A and the INDOT *Standard Drawings* the shoulder width along the mainline will be maintained until 30 m before the gore nose or ramp PC. The shoulder width will then be transitioned to the ramp right shoulder width (typically 2.4 m). In restricted areas, it is acceptable to provide a 2.0-m minimum right shoulder along the entire parallel exit ramp area.

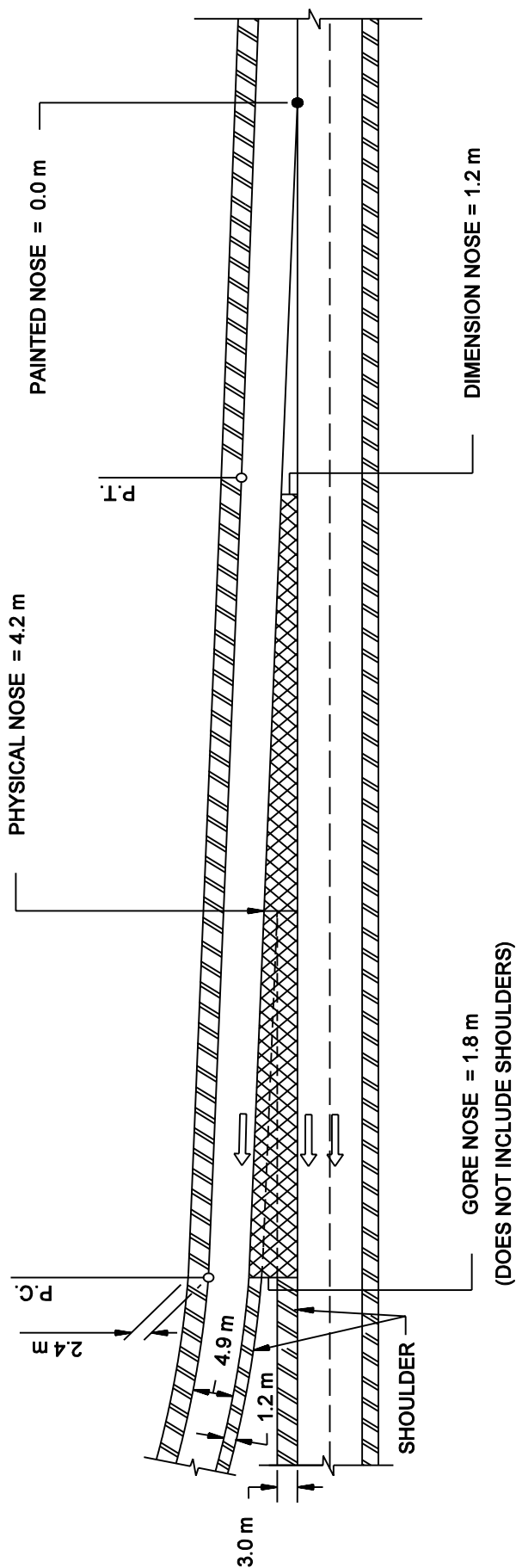
**48-4.01(08) Gore Area**

The term *gore* indicates an area downstream from the intersection point of the mainline and exit shoulders. The gore area is normally considered to be both the paved triangular area between the through lane and the exit ramp, plus the graded area which may extend a hundred meters downstream beyond the gore nose. The following definitions will apply (see Figure 48-4B):

1. Painted Nose. This is the point (without width) where the pavement striping on the left side of the ramp converges with the stripe on the right side of the mainline travelway.
2. Dimension Nose. This is a point where the shoulder is considered to begin within the gore area. For exit ramps, the dimension nose is 1.2 m wide.
3. Physical Nose. This is the point where the ramp and mainline shoulders converge. As illustrated in Figure 48-4B, the physical nose has a dimensional width of 4.2 m.
4. Gore Nose. This is the point where the paved shoulder ends and the sodded area begins as the ramp and mainline diverge from one another. As illustrated in Figure 48-4B, the gore nose has a dimensioned width of 1.8 m and does not include the shoulders.

The following should be considered when designing the gore:

1. Obstacles. If practical, the area beyond the gore nose should desirably be free of all obstacles (except the ramp exit sign) for at least 30 m beyond the gore nose. Any obstacles within 100 m of the gore nose are to be made breakaway or shielded by a barrier. See Section 49-3.0.



EXIT RAMP GORE AREA

Figure 48-4B

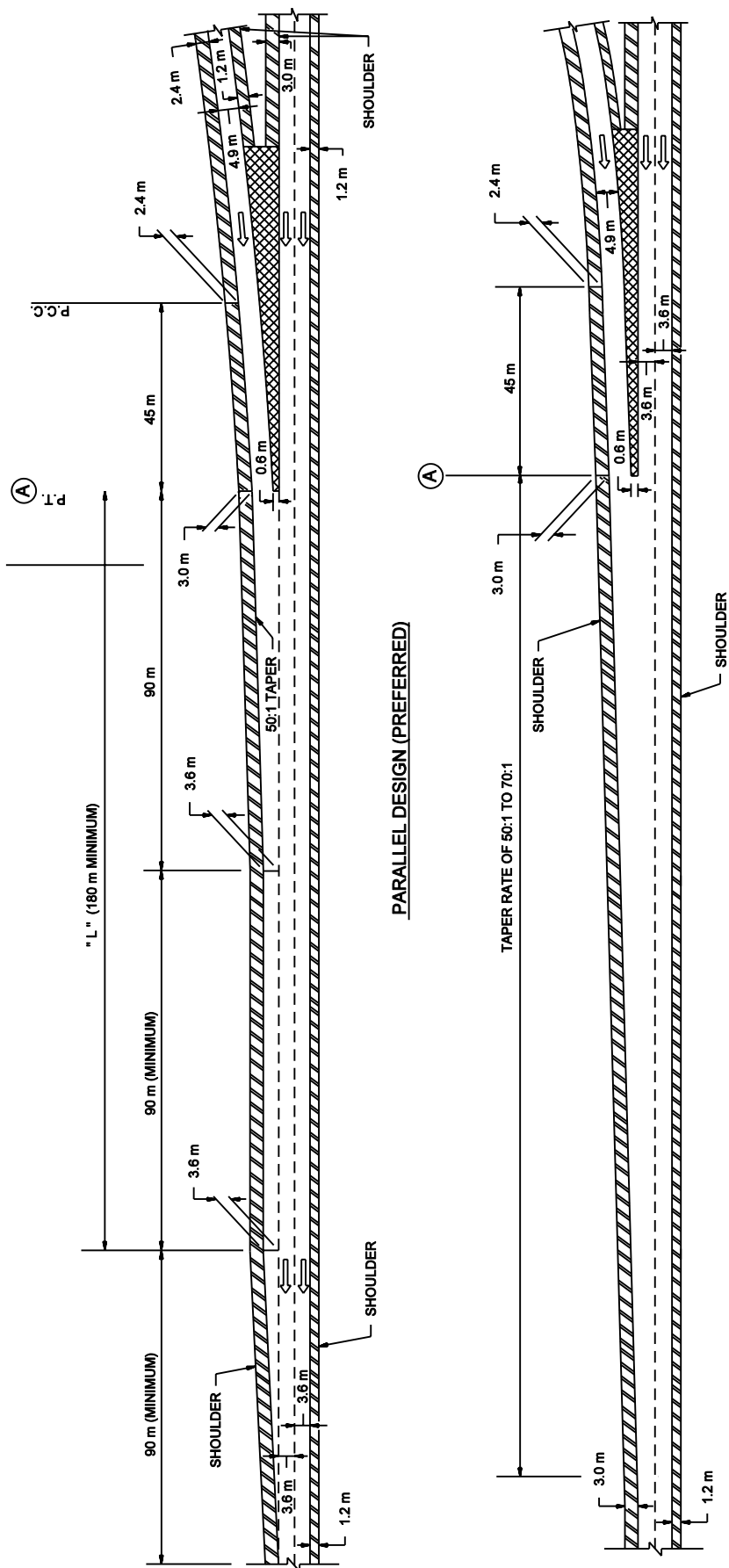
2. Side Slopes. The graded area beyond the gore nose should be as flat as practical. If the elevation between the exit ramp or loop and the mainline increases rapidly, this may not be practical. These areas will likely be non-traversable, and the gore design must shield the motorist from these areas. At some sites, the vertical divergence of the ramp and mainline will warrant protection for both roadways beyond the gore (see Section 49-3.0).
3. Cross Slopes. The paved triangular gore area between the through lane and exit ramp should be safely traversable. The cross slope is the same as that of the mainline (typically 2%) from the painted nose up to the dimension nose. Beyond this point, the gore area is depressed with cross slopes of 2-4%. See Section 48-4.01(06) for criteria on breaks in cross slopes within the gore area.
4. Traffic Control Devices. Signing in advance of the exit and at the divergence should be according to the MUTCD and Chapter Seventy-five. See Chapter Seventy-six for the pavement marking details in the triangular area upstream from the gore nose.

#### **48-4.02 Entrance Ramps**

##### **48-4.02(01) Types**

There are two basic types of entrance freeway/ramp junctions — the parallel design and the taper design. Figure 48-4C illustrates these two entrance freeway/ramp junctions. It is INDOT policy to only use the parallel design on new and reconstructed ramps (Illustration A). The parallel design offers several advantages when compared to the taper design. The following lists a few examples:

1. Where the level of service for the freeway/ramp merge approaches capacity, a parallel design can be easily lengthened to allow the driver more time and distance to merge into the through traffic.
2. Where the acceleration length needs to be lengthened for grades and or trucks, the parallel design provides longer distances more easily than a taper design.
3. Where there is insufficient sight distance available for the driver to merge into the mainline (e.g., where there are sharp curves on the mainline), the parallel entrance ramp allows a driver to use the side-view and rear-view mirrors to more effectively locate gaps in the mainline traffic.
4. Where there is a need for a continuous auxiliary lane, the parallel-lane entrance can be easily incorporated into the design of the continuous auxiliary lane.



TAPERED DESIGN

Notes:

1. L is the required acceleration length as shown in the Figure 48-4D.
2. Point A controls safe speed on the ramp. L should not back on the curvature of the ramp unless the radius equals 300 m or more.
3. L is the distance downstream from where the nose width equals 0.6 m and is suggested for use in the design of the ramp entrance, except as noted in Note #2. above.

TYPICAL ENTRANCE RAMP TYPES  
(Single Lane)  
Figure 48-4C